A PROSPECTIVE STUDY ON SALIVARY GLAND SWELLINGS – INCIDENCE CLINICO PATHOLOGICAL PRESENTATION AND MANAGEMENT

Dissertation submitted to

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M.S. DEGREE BRANCH - II

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CERTIFICATE BY THE GUIDE

This is to certify that this dissertation entitled **"A PROSPECTIVE STUDY ON SALIVARY GLAND SWELLINGS INCIDENCE CLINICO PATHOLOGICAL PRESENTATION AND MANAGEMENT"** is a bonafide work done by **DR.R.RAMESH** in partial fulfillment of the requirement for the degree of M.S. in General Surgery, examination to be held in 2013.

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CERTIFICATE

This is to certify that this dissertation **"PROSPECTIVE STUDY ON SALIVARY GLAND SWELLINGS - INCIDENCE CLINICO PATHOLOGICAL PRESENTATION AND MANAGEMENT"** is a work done by **DR.R.RAMESH** under my guidance during the period of 2010-2012 this has been submitted to the partial fulfillment of the award of M.S. degree in General Surgery (Branch II) Tamil Nadu Dr.M.G.R medical university, Chennai-32.

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DECLARATION

I solemnly declare that this dissertation **"PROSPECTIVE STUDY ON SALIVARY GLAND SWELLINGS INCIDENCE CLINICO PATHOLOGICAL PRESENTATION AND MANAGEMENT"** was prepared by me at Government Mohan Kumaramangalam Medical College and Hospital, Salem-636030 under the guidance and supervision of **Prof.Dr.K.SANTHI, M.S.,** Professor of General Surgery, Govt. Mohan Kumaramangalam Medical College and Hospital Salem. This dissertation is submitted to The Tamil Nadu Dr. M.G.R. Medical University, Chennai in fulfillment of the University regulations for the award of the degree of M.S. Branch II General Surgery.

Place : Salem

Date :

(DR.R.RAMESH)

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CONTENTS

INTRODUCTION

The salivary glands are usually divided into major (parotid, submandibular, sublingual glands) and minor salivary glands found in the upper aero- digestive tract namely nasal cavity, oral cavity, pharynx, larynx, trachea, esophagus and bronchi.

Salivary glands are the site of origin of various pathology ranging from inflammatory lesions to neoplasms with more complex and diverse presentation.Salivary gland swellings usually seen on the sides of the face, below and in front of the ear or in the upper part of the neck.

Due to their typical anatomical location, parotid and submandibular gland swellings often mimic lymphadenopathy. Moreover any swelling within the oral cavity raises suspicion of a sublingual or minor salivary gland neoplasm.But the incidence of salivary gland neoplasms counts only 3% among Head and neck tumours.

The heterogenicity,morphologic variability and rarity makes it difficult to diagnose and manage requiring sound anatomical knowledge and oncological principles either conservatively or surgically.

On account of these features, study on salivary gland swellings is really a much fascinating one indeed.

AIM & OBJECTIVES

- To know the incidence of various salivary gland pathology and their presenting features to our govt general hospital from 2010-2012.
- To assess the age, sex distribution in the study group
- To analyse the various risk factors involved.
- To assess the frequency of occurrence of swellings in the major and minor salivary glands..
- To find the various investigative modalities to confirm the diagnosis.
- To assess the incidence of benign and malignant salivary gland neoplasms among the study group.
- To find out any rare varieties of salivary gland pathology occuring during the study period.
- To analyse the various treatment modalities and the post operative complications with interesting aspects on nerve palsy/paresis.
- To review the literature on the subject.

DEVELOPMENT

PAROTID GLAND:

The parotid gland buds as a diverticulum from the ectodermal lining of the primitive buccal cavity during the earlier 6th week of development. The diverticulum is a cord initially, which become canalized susequently, the proximal portion develops as the parotid duct and the distal portion forming the secretory part,smaller ducts and terminal tubules.

SUBMANDIBULAR GLAND:

The submandibular gland appear at the end of 6th week from the alveolo-lingual groove of primitive oral region.The groove gets converted into a tunnel whose blind end proliferates to form the secretory acini.. The edges of the groove starts closing from behind forming submandibular duct.

Developmental anomalies :

Commonly noted in salivary glands are

1. Gland agenesis
2. Heterotopic glands

3. Gland extension into the two pterygoid muscles (called as pterygoid lobe of parotid) can occur as accessory glands.
4. Unilateral aplasia of the submandibular gland, associated with hypertrophy of the contralateral submandibular gland,
5. Atretic, Imperforate duct and duct ectasia.

ANATOMY

PAROTID GLAND

The parotid gland, largest of salivary glands, is pyramidal, lobulated, yellowish brown, serous, bounded infront by ramus of mandible with masseter and medial pterygoid, posteriorly by mastoid process of temporal bone and sternomastoid, above by external auditory meatus and below by stylohyoid and medially by styloid process of temporal bone. The gland has upper and lower poles with three surfaces – superficial, anteromedial and posteromedial. Parotid gland is covered by true and false capsule.

The upper pole is a concave surface related to the external acoustic meatus and the tempero mandibular joint capsule. The lower pole is rounded, overlapping posterior belly of digastric by lying below and behind the angle of the mandible, indented by mandible and sternocleidomastoid.

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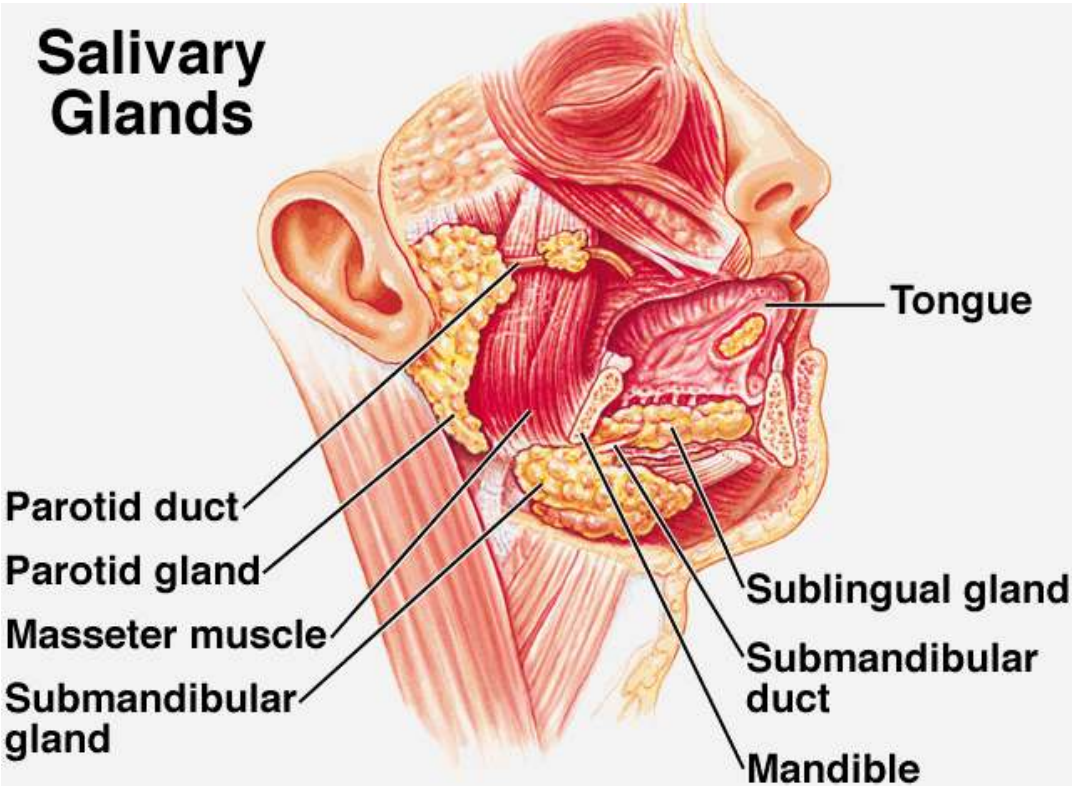
SUPERFICIAL SURFACE:

The superficial surface is covered by skin & superficial fascia which contains facial branches of greater auricular nerve and lymph



LOCATION OF SALIVARY GLANDS

nodes. The posterior border of platysma also lie in this plane. The stylomandibular ligament is present between this surface and the posterior part of the submandibular gland.

ANTEROMEDIAL SURFACE :

The anteromedial surface is grooved by posterior border of ramus of mandible, merging with the superficial surface over masseter forming the anterior border, deep to which arises the parotid duct and the pes anserinus. Underneath this surface the superficial temporal and maxillary arteries leave the parotid.

POSTEROMEDIAL / DEEP SURFACE:

The deep surface is impinged upon by the mastoid process,the sternocleidomastoid and the posterior belly of digastric.The styloid process lies posteriorly with the attached muscles stylohyoid, styloglossus and stylopharyngeus and stylohyoid and its ligaments.

The external carotid artery enters the gland through the lower pole along the line of convergence of anteromedial surface and deep surface. The styloid process is present between the gland and the vessels - the internal carotid artery and IJV.

The branches of the facial nerve - zygomaticotemporal and cervicofacial enter the gland between the styloid and mastoid processes, tragal cartilage forms an arrow-like projection which points downwards towards the nerve (conley's pointer).

FACIAL NERVE:

Structures found within the gland from superficial to deep are the facial nerve, retromandibular vein and external carotid artery.

The facial nerve runs forwards becoming superficial to the retromandibular vein and external carotid artery in its course giving branches behind the anterior border of the gland. Parotid is often described in relation to the nerve branches as having superficial and deep parts. (Patey's fascio venous plane)

Lying below the nerve branches is the retromandibular vein, acting as a guide to the identify the nerves; while following the tributaries of the external jugular vein upwards within the gland, the nerves will be found superficial to the venous course.

Lying deep to veins are the external carotid artery with its two terminal branches within the parotid gland substance. The gland is invaded by twigs of the auriculotemporal nerve - the secretomotor fibers.

Preauricular lymph nodes lie just inside the capsule or within the gland substance.

DUCT OF PAROTID (STENSON'S) :

The parotid duct (5 cm length , 2-3mm in diameter,) runs forwards over the masseter, hooks around its ventral aspect and pierce the buccinator. It lies in the line connecting the tragus and the midpoint of the philtrum.

After piercing the buccinator it runs forwards beneath the mucous membrane to its orifice opposite the crown of upper second molar teeth, forming a valvular flap of mucous membrane which prevents gland inflation on increased intraoral pressure.

Blood Supply

Branches from the external carotid artery serves blood supply. Venous blood drains via the retromandibular vein.

Lymphatic drainage

Lymph drains to the nodes within the parotid sheath and then along the external carotid artery to the upper deep cervical nodes.
(LEVEL II).

NERVE SUPPLY

Sensory:

The parotid fascia receives its sensory innervation from the greater auricular nerve (C2). The gland itself receives sensory fibres from the auriculotemporal nerve.

Sympathetic:

Sympathetic (vasoconstrictor) fibres from the superior cervical ganglion forms plexus on the external carotid and reach the gland.

Parasympathetic

The preganglionic fibres arise from cell bodies in the inferior salivary nucleus in the medulla, and travel via the tympanic branch of glossopharyngeal nerve to enter the otic ganglion. From the oticganglion post ganglionic secretomotor fibres reach the gland via the auriculotemporal nerve.

SUBMANDIBULAR GLAND:

The submandibular gland, irregular/J-shaped, mixed (mucous and serous) type, consists of large superficial part and a small deep part,continuous with one another round the free posterior border of rnylohyoid.

The superficial part is situated between the mandible, mylohyoid and the investing layer of deep cervical fascia, and it has three surfaces namely,lateral, inferior and medial.

Superficial Surface

The superficial surface is covered by skin, platysma, the investing fascia, common facial vein, the cervical branch of VIIth nerve, the marginal mandibular branch of the facial nerve crosses the surface usually. Submandibular lymph nodes lie in this plane.They are also found within gland substance.The deep part of the gland extends forwards between mylohyoid and hyoglossus. It is related to the lingual nerve, submandibular ganglion, wharton's duct and hypoglossal nerve.

Medial Surface

Medial surface lies against mylohyoid and its vessels, posteriorly in relation with stylogossus, stylohyoid and ninth cranial nerve. Medially it is related to hyoglossus and lingual nerve, submandibular ganglion, hypoglossal nerve and deep lingual vein.

Lateral Surface:

The lateral surface lies infront of the submandibular fossa of the mandible, covering the insertion of the medial pterygoid,deeply grooved posteriorly by the facial artery.

DEEP PART :

This part bounded below and laterally by mylohyoid, medially by hyoglossus and styloglossus, above by lingual nerve and submandibular ganglion and below to hypoglossal nerve and deep lingual vein.

SUBMANDIBULAR DUCT : (WHARTON'S)

The submandibular duct is 5 cm long, arises from the middle of medial surface of the gland near the posterior border of mylohyoid. It runs forwards first between mylohyoid and hyoglossus and then between the sublingual gland and geniohyoid, to open into the floor of the mouth at the side of the frenulum linguae. Lingual nerve bears triple relation to duct. First it descends on its lateral side, curves round its inferior side and then ascends up on its medial side.

Blood Supply

Facial artery and Lingual artery supplies the gland

Venous drainage is via anterior facial vein.

Lymphatic Drainage :

Lymphatics drain into the submandibular nodes.

Nerve Supply:

Sympathetic supply :

from the lingual br,of mandibular nerve.

Parasympathetic supply:

The preganglionic fibres pass from superior salivary nucleus in pons through chorda tympani branch, of VII N. Secretomotor fibres to the gland comes from the submandibular ganglion with a few in small ganglionic masses on the gland surface itself..

SUBLINGUAL GLAND

The sublingual gland is mucus secreting gland, lying in front of the hyoglossus, between mylohyoid below and in front and the side of the tongue (genioglossus) medially. These lie anterior to the submandibular gland under the tongue, beneath the mucous membrane of the floor of the mouth, drained by 8-20 excretory ducts called the ducts of Rivinus.The largest of all, the sublingual duct of Bartholin joins the submandibular duct and drain through the sublingual

caruncle. Most of the remaining small sublingual ducts open separately into the mouth on an elevated crest of mucous membrane, the plica fimbriata located on either side of the frenulum linguae.

Blood supply :

It is supplied by the lingual artery and submental branches. The venous return is by corresponding veins.

Nerve supply :

The chorda tympani branch of the facial nerve via the submandibular ganglion is secretomotor to the sublingual gland.

MINOR SALIVARY GLANDS:

These are scattered in the mucosa of the upper aero digestive tract,Oralcavity lips, cheek,palate,floor.tonsillar (Weber's),Retromolar region (Carmalt's glands),Nasal cavity,pharynx &Larynx.

The palate contains the most of it in density.

ECTOPIC SALIVARY GLANDS:

- Usually seen in relation to submandibular gland.
- Commonest ectopic salivary tissue – stafne bone cyst.

HISTOLOGY

PAROTID GLAND :

For parotid gland it is characterized by three features - predominantly serous acini, Numerous ducts, and fat cells scattered between the acini and ducts.

SUBMANDIBULAR GLAND:

The submandibular gland, has a mixture of serous and mucous acini and few ducts.

SUBLINGUAL GLAND:

The Sublingual gland - nearly exclusively mucous acini and few ducts.

PHYSIOLOGY

Maximum salivary secretion is from submandibular gland(65%-75%) parotid contributes to 20% and very little from sublingual gland 10%.

Total salivary secretion is 1.50 liters per 24 hours.

Salivary Gland functions:

1. Assists in digestion of food particles with its enzymes amylase and lipase.
2. Improves taste sensation through its solvent action,
3. Antimicrobial function through its IgA and Lysozyme.

Salivary secretion:

Parasympathetic stimulation causes vasodilation and copious secretion of watery saliva. Stimulation of sympathetic supply causes vasoconstriction and secretion of viscous saliva rich in organic substances.

Salivary secretion is stimulated by food in the mouth, sight, smell and thought of food. There are two phases of secretion, one is resting phase and the other is gustatory phase.

LITERATURE REVIEW

Conditions producing salivary gland swellings

Sialosis:

Salivary gland swelling occurring as a result of fatty infiltration due to various metabolic disorders and namely

1. Diabetes
2. Acromegaly
3. Obesity
4. Liver disease
5. Alcoholism
6. Bulimia
7. Idiopathic, and drug induced(atrophine variants, carbimazole, thiouracil.)

Patients presents with bilateral, diffuse, nontender,firm enlargement of salivary glands primarily involving the parotid.

Management is to treat the cause.

Sialolithiasis:

Sialolithiasis are calcified organic matter within the ducts. Submandibular gland is the most common site due to the tortuous course of wharton's duct,high calcium and phosphate levels and the

dependent position of submandibular gland leading to stasis. Acute cases present with swollen painful gland while eating .Chronic cases end up with fistula, sinus or ulceration. Diagnosis can be achieved by clinical examination, imaging studies etc. Treatment is surgical. Gland removal is the treatment of choice.

Minimally invasive methods like extra corporeal shock wave lithotripsy (ESWL) and intra corporeal laser lithotripsy, sialoendoscopy, endoscopically video-assisted trans-oral and cervical surgical retrieval of stones, and botulinum toxin therapy are tried nowadays with variable results.

Shock-wave lithotripsy

Sialolithotripsy is a non-invasive method of fragmenting salivary stones into small pieces flushing them out from the duct spontaneously or after induced salivation.

ESWL :

High energy shock waves are generated outside to crush stones inside the body. A pulsed dye laser is used to break sialoliths with the help of flexible endoscope.

EXCLUSION CRITERIA FOR ESWL :

- Stones with a diameter of < 2 mm/ which cannot be identified using an ultrasound probe
- In the presence of complete distal duct obstruction;

CONTRA-INDICATED:

- In patients with acute sialadenitis
- In patients with cardiac pacemakers.

LIMITATIONS:

Few stone fragments were left inside the ducts which becomes the *nidus* for recurrent calculi.

SIDE EFFECTS: Pain, swelling & bleeding.

Intra-corporeal shock-wave lithotripsy

In intra-corporeal lithotripsy, the shock-waves reach the stone through a lithotripsy probe placed inside the salivary duct under flexible endoscopic guidance. The energy needed to break the stone is provided by means of a laser beam, pneumatic devices, or electro-hydraulic probes.

Sialoendoscopy (katz scopy)

Initially used for diagnostic purposes, now used interventionally in obstructive salivary gland disease. Various rigid, semi-rigid and flexible devices, of different diameters(1.2 mm the upper limit) equipped with working channels and irrigation ports have been developed, in order to avoid iatrogenic lesions.

Absolute contraindication:

Complete distal obliteration of the duct.

Side-effects :

1. Gland swelling, duct strictures, basket block, infections, lingual nerve palsy & lacerations.

Conservative trans-oral surgical removal :

Trans-oral retrieval of stones is currently considered the treatment of choice for deeply sited submandibular stones.

Contra-indication is limited mouth opening.

Post-operative complications

Tingling at the tip of the tongue, swelling of the floor of the mouth ,Lingual nerve injury, Ranulas ,Strictures & Infections.

Endoscopically assisted stone removal :

1. INTRA-ORAL SIALOLITHOTOMY: ("ductal stretching technique")
2. THE EXTRA-ORAL TECHNIQUE :

Reserved for impacted intraparenchymal parotid stones or stones posteriorly situated in ducts with proximal duct obstruction.

Contra-indications : deep seated stones.

Post-operative complications :

Swelling and paresthesia of the periauricular skin, Infections, Post-op strictures, Damage to the ducts.

Botulinum toxin therapy :

Botulinum toxin therapy, has been used in the management of disorders characterised by an increased salivary flow rate such as drooling, sialorrhea, and salivary fistulas.

INFECTIONS:

Majority of salivary gland infections are viral and few are bacterial. The initiation and progression of infection depends on the decrease in host resistance beyond general conditions predisposing to sialoadenitis like debilitation, dehydration and local conditions like duct obstruction due to sialolith, stricture etc.

Viral infections:

The most common viral infection is mumps, caused by an RNA paramyxovirus with an incubation period about 2-3 weeks. Mumps primarily involves the parotid, with pain and tenderness, fever, malaise, chills and sore throat. There is no sex predilection.children are more affected than adults. The diagnosis is made clinically and via serological investigations. Treatment of mumps is usually symptomatic.

Salivary gland diseases in HIV infection :

Xerostomia or salivary gland enlargement are the two main presentations .

Bacterial sialadenitis:

Bacterial infection may be acute or chronic. The incidence is very low, mostly involving parotid glands. Certain drugs, localized

Gross Picture sub mandibular sialadenitis

sielectasis, calculous duct obstruction causes reduced salivary flow and retrograde bacterial infection of glands or duct.Staphylococcus aureus is the commonest beyond streptococci and gram negative bacilli. Symptoms are pain,swelling, raised temperature and trismus due to spasm of masseter.

The treatment of bacterial sialadenitis is by broad spectrum antibiotics, rehydration, analgesics and surgery.

REACTIVE LESIONS:

Mucocele:

Mucocele is the mucus retention cyst that commonly affects the minor salivary glands.Younger age group are more affected with slight male predilection. These are located most frequently in lower lip (60-70%). They present as painless bluish swellings.The diagnosis of mucocele is based on clinical examination, radiographic findings and histological findings, fine needle aspiration may demonstrate the mucus with inflammatory cells. Chemical analysis reveals high amylase and protein contents.

Ranula:

Ranulas results from either mucus retention or extravasation due to ductal disruption. Superficial ranula seen on oral aspect of

mylohyoid muscle and the plunging ranula extend below mylohyoid muscle and manifest extraorally.Clinically ranula presents as unilateral, fluctuant bluish translucent soft tissue mass on floor of mouth commonly in sublingual glands.Diagnosis is based on clinical examination, imaging and aspiration of mucinous salivary fluid. The treatment modes are marsupialization, excision of the involved gland or sialolithectomy.

Surgery for the Treatment of ranula

An intraoral incision was made along the horizontal axis of the sublingual gland, and the gland was dissected from anterior to posterior,to protect the submandibular duct. care was taken to identify and preserve the lingual nerve as it passed under duct at the posterior border,. The posterior portion of sublingual gland must be carefully excised as it may be associated with oral extension of the submandibular gland. The wound was repaired using absorbable sutures.

Plunging ranula was treated through an extraoral approach. A submandibular incision was made just above the level of the hyoid bone, subcutaneous tissues were dissected to expose and excise the cyst capsule, then the myelohyoid muscle was retracted and the

sublingual gland excised. Wound repair is then done in layers.

The intraoral approach is the best approach as it is less chance of injury to the submandibular duct and gland and the lingual nerve.

Necrotizing sialometaplasia:

This is a benign condition that typically affects minor salivary glands of the palate. This results from local ischemic injury of salivary gland lobules.commonly seen in young ages with a slight male predilection.Unilateral painful swelling is the usual presentation. Acini becomes necrotic and then squamous metaplasia occurs. Treatment is usually symptomatic.

AUTOIMMUNE DISORDERS :

Sjogren syndrome:

Sjogren syndrome is an entity characterized by dry eyes (keratoconjuctivitis sicca) and dry mouth (xerostomia) due to immune mediated destruction of salivary glands and lacrimal glands. There are two types ,the primary form, isolated, known as sicca syndrome and secondary form with associated connective tissue disorders like rheumatoid arthritis,etc ,

The specific cause is unknown, probably viral, resulting in

immunological alteration leading to polyclonal b cell hyperactivity. It is usually associated with HIV, HTLV and hepatitis. The symptoms are xerostomia, parotid enlargement,keratoconjuctivitis sicca, anaemia, leucopenia. Management is by artificial saliva and tears, maintainence of oral hygiene & topical fluoride. Its has tendency to turn into lymphoma.

Salivary gland neoplasms:

All benign salivary gland tumours have been arising from salivary acinar cells or ductal cells. The occurrence vary with geographic distribution. Parotid glands are most commonly affected

Etiology:

Five documented etiologies

1.Radiation

2.Occupation

3.l.ife style

4.Harmones

5.Virus infections

Low dose radiation exposure,exposure to UV rays, Genetic factors like mutation in chromosome 12q causing pleomorphic adenoma, Smoking predisposing to warthin's tumour, viral infection(ebstein barr virus) leading to lympho epithelial neoplasms,

silica exposure causing parotid carcinoma, rubber workers exposed to nitrosamines at risk to develop salivary gland tumours are few well known causes.

PATHOGENESIS

WHO CLASSIFICATION:

1.Epithelial: Adenomas ,Carcinoma

2.Non epithelial tumors

3.Malignant lymphomas

4.Metastatic tumors

5.Unclassified tumors

6.Tumor like lesions

EPITHELIAL TUMOURS EPITHELIAL TUMOURS

ADENOMA :

Myoepithelioma,Pleomorphic adenoma, Basal cell adenoma, Warthinstumor,Oncocytoma,Canalicularadenoma, Sebaceous adenoma Ductal Papilloma Inverted ductal papilloma Intraductal Papilloma Sialadenoma papilliferum Cystadenoma Papillary cystadenoma Mucinous cystadenoma

CARCINOMA

LOW GRADE: Acinic cell carcinoma,Mucoepidemoid carcinoma

HIGH GRADE : Mucoepidermoid carcinoma,Adenoid cystic carcinoma,Malignant plemorphic adenoma,Carcinoma Ex pleomorphic adenoma, Squamous Cell Carcinoma, Adenocarcinoma Oncocytic Carcinoma, Salivary duct carcinoma.

II.NON-EPITHELIAL TUMOURS (CONNECTIVE TISSUE TUMOURS)

BENIGN :

Hemangioma, Lymphangioma, Lipoma, Neurilemmoma, Fibroma.

MALIGNANT:

1. Malignant schwannoma
2. Rhabdomyosarcoma
3. Anaplastic carcinoma
4. Fibrosarcoma
5. MFH, Melanoma

III. METASTATIC TUMOURS

1. Malignant melanoma
2. Squamous cell carcinoma

Gross picture Parotid Swelling

IV.TUMOR LIKE LESIONS:

Few tumor like lesions commonly noted are: Benign lymphoepithelial lesion, Chronic selerosing sialadenitis of submandibular gland (Kuttner's tumor), Cystic lymphoid hyperplasia in AIDS, Salivary gland cysts, Sialadenosis, etc.

BICELLULAR OR RESERVE CELL THEORY:

This theory states that tumours arise from two stem cells namely, intercalated duct reseve cell giving rise to pleomorphic adenoma like tumors and excretory duct cells giving rise to squamous and mucoepidermoid tumors.

Multicellular theory

According to this theory, Salivary gland tumours are derived from different cell types in the matured salivary gland units.

TUMOURS	CELL OF ORIGIN
1.Squamous/mucoepidermoid carcinoma	Excretory duct cells
2.Warthin / Oncocytic tumors	Striated duct cells
3.Acinic cell tumors	Acinar cells
4.Mixed tumors	Intercalated duct

BENIGN TUMOURS

Pleomorphic adenoma:

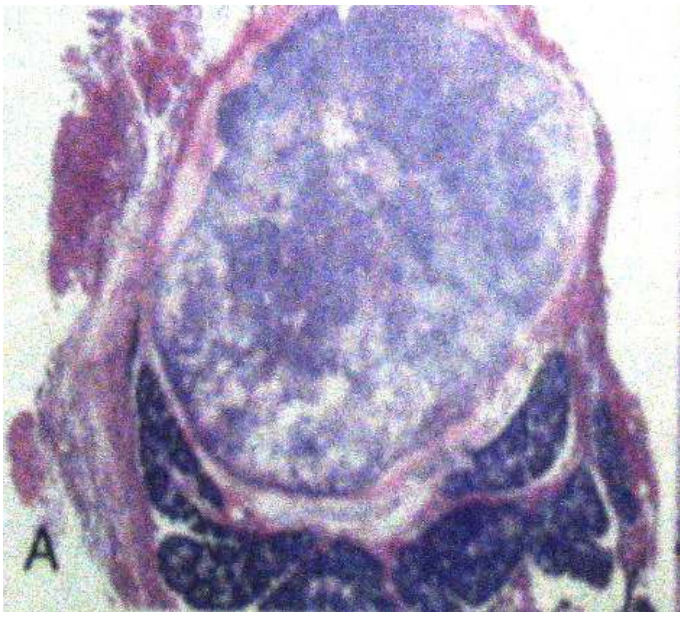
As the name suggests tumour, contains both epithelial and mesenchymal differentiation. The term pleomorphic adenoma - coined by willis is therefore an appropriate designation. It is the commonest neoplasm involving mostly superficial lobe of Parotid. It can also occur in minor,ectopic salivary glands. In deep lobe involvement it is termed as the dumbbell tumour. They constitute about 10% parapharyngeal mass resulting in facial paralysis. Peak incidence is around 40 years of age;

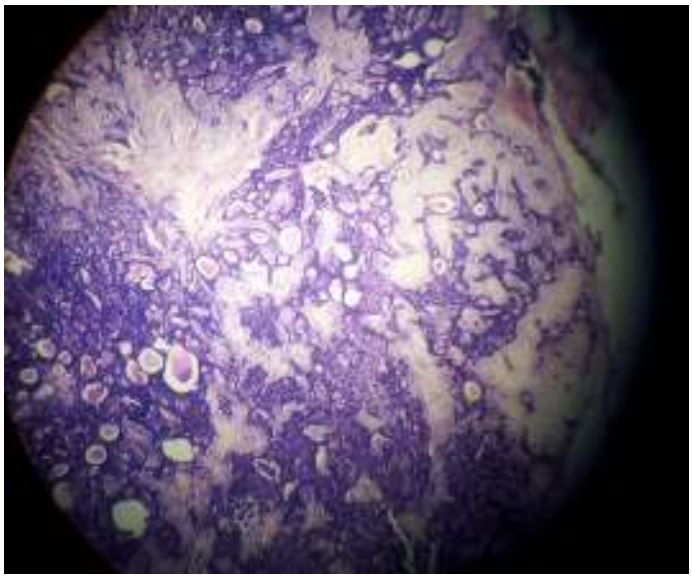
Gross Appearance:

Well circumscribed, encapsulated, cut surface shows homogenous yellow to greywhite nodules connected by delicate fibrous septa with cystic spaces,cartilages,solid tissues in it.

Histological Picture

- Two groups of cells - epithelial ,spindle cells.
- Epithelial - Epithelial element predominates, keratin pearls - characteristic feature.
- Mesenchymal component with spindle cells- myo epithelial in nature.It contains myxoid, hyaline, cartilagenous or





A. Low power view showing a well demarcated tumour with adjacent normal salivary gland parenchyma.

B. High Power view showing epithelial cells as well as myoepthalial cels found within a chondroid matrix material.

osseous tissues. Myxochondromatous mesenchymal element predominates in this type.

- For epithelial cells - cytokeratin,,epithelial membrane antigen,,carcino embryomic antigen serves as markers.
- For Myo epithelial cells - cytokeratin,smooth muscle actin(SMA),& S-100 protein.
- For Mesenchymal cells – heparin sulfate can be used.

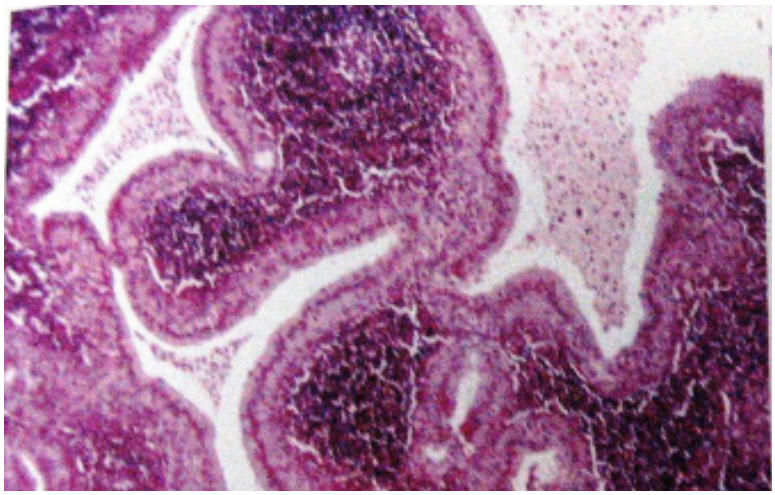
Metastasizing mixed tumor:

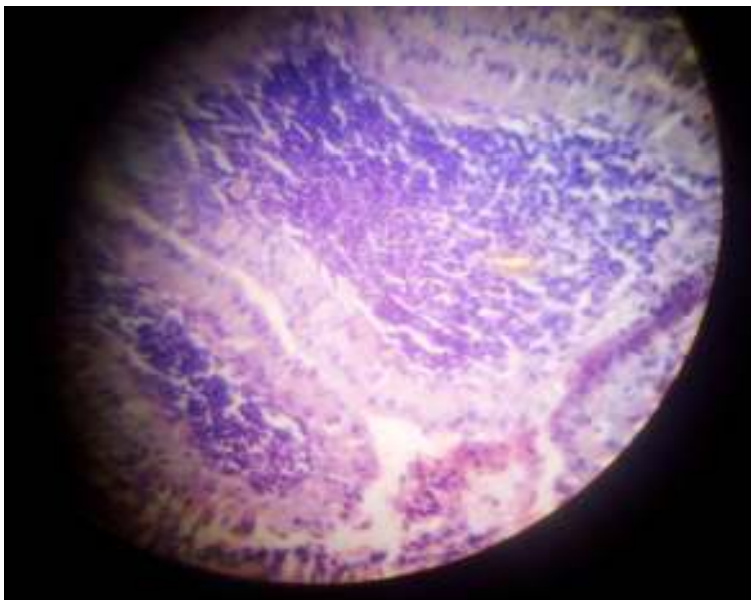
Pleomorphic adenomas with benign histologic appearance can metastasise to sites like regional lymph nodes, lungs, kidney; retroperitoneum, oral region, pharynx, skull& brain; bone involvement being the commonest site.

WARTHIN'S TUMOR

Adeno lymphoma or Papillary Cystadenoma Lymphamatosum

Warthin tumors is derived from salivary tissue inclusions in lymph nodes. usually diagnosed in middle and oldage men, 10%–15% showing synchronous bilateral disease. Second most common tumour involving usually tail of parotid lobe Smoking is a proved etiology. It is the only salivary tumour more common in males.





a. Low power view showing epithelial and lymphoid elements. The follicular germinal center inside the epithelium

b. Cystic spaces separate lobules of neoplastic epithelium consisting of a double layer of eosinophilic epithelium based on reactive lymphoid stroma.

Usually presents as asyptomatic, slow growing soft, cystic sometimes fluctuant usually bilateral, mobile, multicentric mass, Treatment of choice is surgical excision.

Gross Appearance:

Grossly well defined soft, cystic swelling with cut section showing brownish mucus.

Histological Picture:

Cut section shows irregular fine papillary projections with tall columnar epithelium with eosinophilic and granular cytoplasm projecting into cystic spaces. Core of papillary process contains abundant lymphoid tissue with germ centre.

Characteristic feature:

- The characteristic feature is the oncocytic cell which secures sodium per-technate (99mTc) showing a hot spot. Lymphyoid stroma composed of mature B cells containing immunoglobulin IgG and IgA.
- Gene rearrangements in 6p and t(11; 19) specific for warthin tumor serves diagnostic.

MYOEPITHELIOMA

Myoepithelioma is a rare tumour, (less than 1%) of myoepithelial cells of salivary gland. It is considered as one end of spectrum of pleomorphic adenoma. Usually involves parotid gland with peak age of incidence around 4^{th} decade. No sexual predilection noted. Patient presents with an asymptomatic swelling.

MONOMORPHICADENOMA

These are formed of single cell type and hence the name .

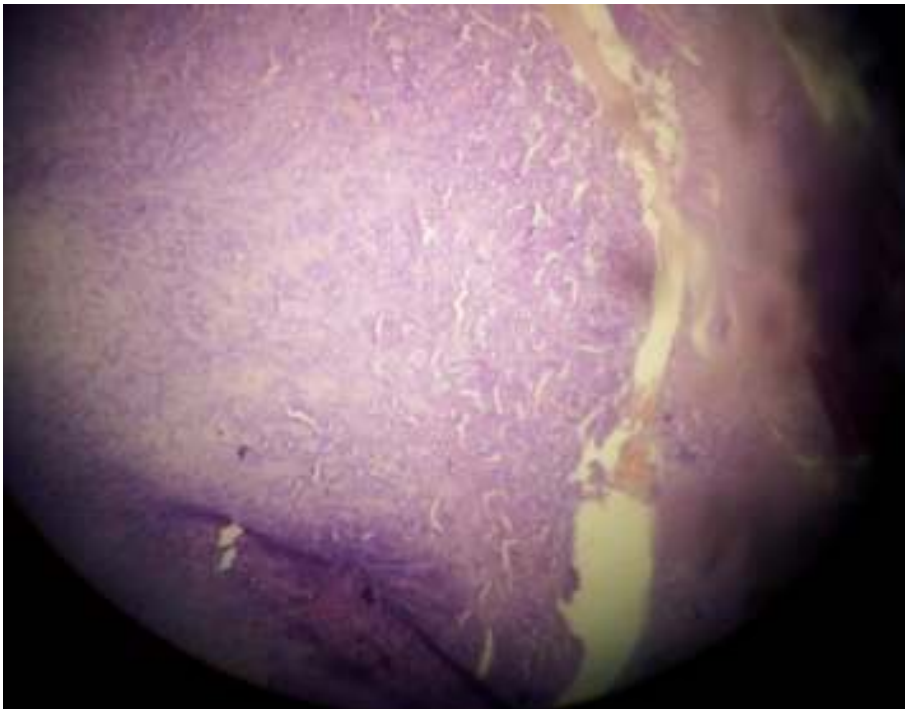
There are two types: Canalicular & Basal cell.

CANALICULAR ADENOMA

- Female predominance noted.
- Usually lesion arises from minor salivary glands.
- Seen involving the palate,gingivo buccal mucosa and upper lip in common.
- Capsulated tumour with cuboidal or columnar cells.
- Cord of epithelial cells arranged in a parallel fashion surrounding cystic spaces with eosinophilic matrix.
- Treatment : excision / enucleation.

BASAL CELL ADENOMA

- Arises from reserve cells or intercalated cells.



Low power view showing case of Basal cell adenoma

- Common in 6th decade involving superficial lobe of parotid.
- In minor salivary glands it is noted in upper lip.
- Microscopically these are basaloid and isomorphic. Various types includes Tubular, Membranous, Trabecular, and Solid (M.C.).
- Treatment : excision / enucleation.

ONCOCYTOMA

- These are benign tumours of epithelial origin with ONCOCYTES rich in mitochondria.
- Parotid is the predominant site. Mostly involves 7th to 9th decade females
- Exposure to radiation therapy to head and neck region around 20 years or younger age group serves the cause.
- Well defined solitary usually solid rarely cystic lesions can occur. Histologically similar to warthin‘s tumour but with acidophilic cytoplasm lacking lymphoid elements. Mitotic figures are absent.

HEMANGIOMA

- Most common in newborns infants and children

- Usually involve the superficial lobe of parotid gland and Less often the submandibular gland
- Female predominance..
- Usually presents as an asymptomatic, unilateral, compressible mass.
- Two types : capillary & cavernous
- Cavernous type most common.
- Can extend into hypopharynx & intracranially.

TREATMENT:

- Treatment should initially consist of steroids administered 2-4 mg/kg/d spontaneous involution if fails, surgical excision (total parotidectomy).

SEBACEOUS NEOPLASMS:

- Rare tumours arising from sebaceous gland rests (0.1-1% incidence).
- Adenoma and lymphadenoma are the two variants.
- Sebaceous adenoma commonly involves parotid gland with male predominance.

- Sebaceous lymphadenoma seen in females involving parotid gland commonly.

LIPOMA

It is a lobulated soft swelling grossly with yellow tan.

Average age of incidence is around 40=-50 years.

Treatment of choice is surgical excision.

MALIGNANT TUMOURS

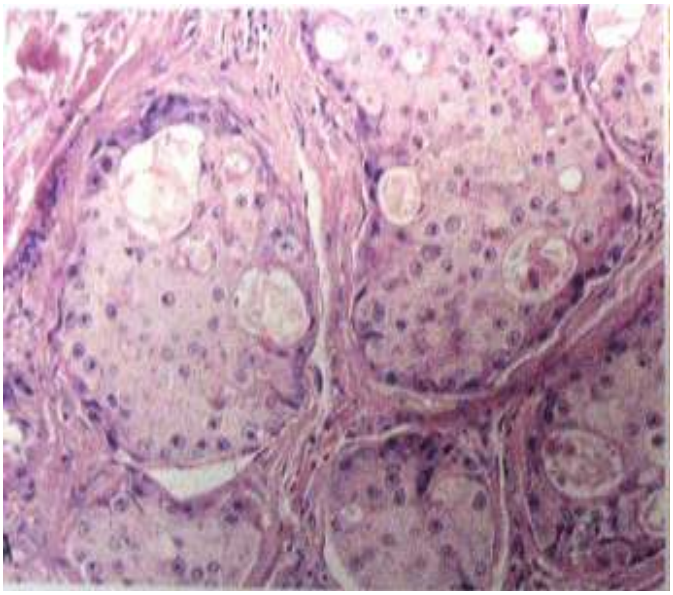
MUCOEPIDERMOID CARCINOMA:

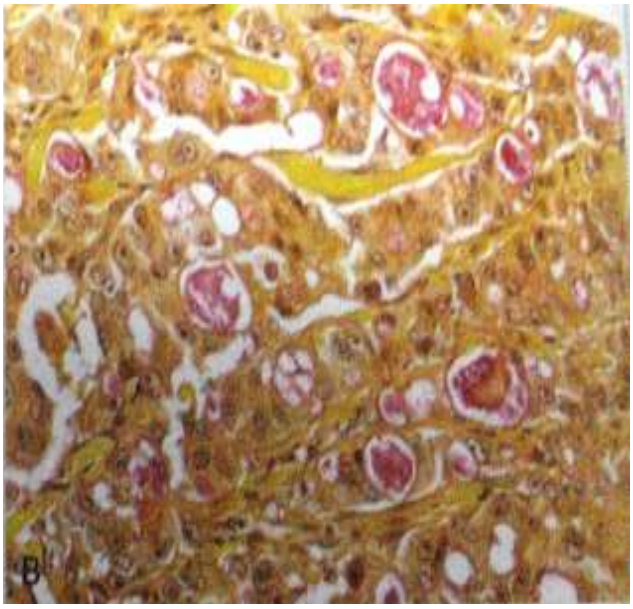
Most common malignant tumour involving both major and minor salivary glands. Involves all age groups. No sex predilection noted. Parotids among major & in palatal glands among minor gland are commonly involved. Solid,cystic,semisolid tumours with variable aggressiveness.either low grade/high grade.Less involvement of facial nerve noted.

Occasionally these metastasise to lungs, lymph nodes etc.

HISTOLOGICALLY

- Four cell types noted. Squamous, mucin producing, intermediate, clear cells.





A. Mucoepidermoid carcinoma showing islands having squamous cells as well as clear cells containing mucin.

B. Mucicarmine stains the mucin reddish-pink.

- Low grade – well defined, cystic, mucinous.
- High grade - infiltrative with more squamous cells

ADENOID CYSTIC CARCINOMA (cylindroma):

Most common malignancy of minor salivary gland tumours (incidence upto 30%.). It is the second-most common malignancy next to muco epidermoid carcinoma. Maximum incidence is in the sixth to seventh decade. Usual presentation is facial pain. No sex predilection noted. Perineural and perivascular spread with skip lesions is characteristic resulting in pre-op facial paralysis . Highly aggressive as it presents with distant metastasis even after 10 years of initial treatment.

- Poorly encapsulated infiltrating hard tumour with minimal lymphatic spread
- Blood spread results in lung metastasis.
- Local infiltration leads to mandibular involvement.

Histology:

Nests of columnar cells seen arranged concentrically around the gland like space filled with mucin like material.

There are three types.

- cribriform pattern – differentiated
- cribriform/solid pattern – moderately differentiated
- Solid – undifferentiated
- Treatment: Radical excision & / radiotherapy advised.

MALIGNANT MIXED PAROTID TUMOUR:

- Carcinoma ex pleomorphic adenoma (carcinoma arising from a mixed tumour) with incidence around 1 to 10%.

ACINIC CELL CARCINOMA

- Rare low grade encapsulated tumour exclusively seen in parotid.
- Can be bilateral with female preponderance.
- Common in 4^{th} and 5^{th} decades. Though its a carcinoma, five years survival rate 90%. Thereby exhibiting variable biological behaviour.
- Less than 10% of people have lymphatic and distant metastasis.

HISTOPATHOLOGY:

Characteristic feature:

Highly cellular tumour with absent stroma, with eosinophilic granular cytoplasm.

Treatment : Radical excision.

SQUAMOUS CELL CARCINOMA

- Very rare tumour.arising from squamous metaplasia of duct epithelium. Usually involves elderly males, Highly aggressive when involving submandibular gland. Presentation will be early skin infiltration, ulceration, severe pain, etc,
- 50% of patients will have cervical node enlargement as presenting symptom.
- Radiotherapy will be useful.

MALIGNANT LYMPHO EPITHELIOMA-PAROTID

ORIGIN : Denova or from benign to malignant transition. (EBV infection may be precipitating factor. Male : female ratio=3:2.Around 15% have submandibular gland involvement. Other sites like skin, larynx, floor of mouth, tonsil and sinonasal tract are also involved. Usually presents as painful mass with frequent involvement of facial n & cervical lymph node involvement.

TYPES:

Infiltrative

Partially circumscribed

Multinodular.

LYMPHATIC SPREAD : parotid, cervical, retroauricular nodes

HEMATOGENOUS SPREAD : lungs, liver, and bone.

IMMUNOHISTOCHEMISTRY:

Epithelial cells are cytokeratin +ve.

MODERN TECHNIQUES IN DIAGNOSIS:

Genome detection can be done by FISH technique in malignant cells.

TREATMENT

Complete surgical excision with neck dissection followed by post operative radiotherapy.

DEEP LOBE TUMOUR OF THE PAROTID:

DEFINITION:

Tumours located deep to facial nerve are called deep lobe tumours.

Also extends into parapharyngeal space.

- 10% of pleomorphic adenoma occur in the deep lobe
- Usually displaces soft palate / tonsils medially
- High recurrent rate

HISTOLOGY : Myxoid or chondroid matrix

CLINICAL FEATURES

They usually present initially as asymptomatic slow-growing tumours in over 50 yrs of age.

Sudden onset of pain may be due to nerve infiltration, soft tissue involvement causing local ulcers or referred pain.

Rapid enlargement should arouse suspicion of ;

i) Intralesional haemorrhage within the tumour.

ii) Malignant transformation(1%-7%) – *Carcinoma ex pleomorphic adenoma.*

iii) Cystic degeneration of tumour.

In Parapharyngeal tumours pressure symptoms are predominant with patient presentation includes 7^{th} nerve palsy, difficulty in swallowing, hoarseness, change of voice .

Suspect for malignant neoplasms when

i) Swelling showing sudden increase in size.

ii) Induration and/or ulceration of overlying skin, and

iii) Nodal enlargement if any.

Minor salivary gland tumours.

Most of them are carcinomas. They present as a painless submucosal mass initially, later ulceration develops. Perineural involvement is expressed as pain or paresthesia. Lymph node

metastasis occurs as predictable sites. Important differential diagnosis, is squamous cell carcinoma for the given site.

INVESTIGATIONS

FNAC/FNAB

FNAC is Fine Needle Aspiration Cytology.

Various studies suggests FNAC has an

- Accuracy : 84-97%
- Sensitivity : 95%
- Specificity : 86-100%

PROCEDURE

- After adequate skin preparation, a 25- or 23-gauge needle is used on a plastic disposable 10- or 20-mL syringe attached to a plastic or metal holder
- The nodule is fixed between the fingers, and the needle tip is directed through the skin into the nodule.
- The needle is continuously aspirated once it enters the mass by moving in and out to get adequte sample.
- Suction pressure is then relieved, and the needle is withdrawn and detached from the syringe.

- The material is gently pushed over a slide using syringe, smeared,dried and immediately dipped in alcohol fixatives,stained by hematoxylin-eosin stain.

With the availability of sufficient clinical history,an experienced pathologist can provide good diagnostic accuracy for both neoplastic and non neoplastic swellings.

Advantages :

- Comparatively cheap
- Done as op procedure
- Easy technique to perform.
- Meager complication rates.
- Good validity- reliable & repeatable

X-RAY

- A plain x-ray can be used to detect stones in the salivary gland
- It has an accuracy of about 80%

SIALOGRAPHY

Radiographic examination of the salivary glands. in which a small amount of contrast medium is injected into the salivary ducts of a single gland, followed by series of X-rays to know the flow of the

fluid, to identify obstructions if any and its site, and also the rate of fluid excretion from the gland. Usually x ray lateral oblique views of the face is advised.

Indications

- To trace Salivary gland / duct calculus /tumours/ duct stenosis / obstruction
- Sjögren's syndrome

Contraindications

- In patients with acute infection and in patients who are allergic to contrast.
- And in those going to have thyroid function tests

ULTRASOUND

- To assess superficial parotid, submandibular, and sublingual masses
- To assess the swelling is cystic or solid.
- To assess whether a lesion was benign or malignant (90%) on the basis of tumor margins.
- To distinguish extraglandular from intraglandular pathology with an accuracy of 98%

Disadvantages of US:

- It cannot evaluate deep parotid masses,or tumours with parapharyngeal extension and those lesions obscured by the mandible,
- It cannot delineate tumour's intracranial or skull base extent.

CT SCAN

- Less invasive
- No need for contrast medium
- Used to evaluate mass lesions in the gland

MRI

INDICATIONS:

- Deep lobe parotid tumours
- Neurologically symptomatic tumours
- Recurrent tumours
- Large size
- Minor salivary gland tumours

PET SCAN

- In initial staging of the disease & for monitoring after treatment
- Histologic grade can be predicted by 18F-FDG uptake, providing useful preoperative information for surgical planning.
- DRAWBACK: Prognosis and survival of patients with salivary gland malignancies may not be predicted.

Technetium pertechnetate scan

Technetium is preferred because

- Gamma rays that it produces are easily detected
- It has a short half life
- The residual radioactivity is negligible so that side effects are less
- It is biologically inert and possible to inject intravenously

The imaging is undertaken in three phases

- Dynamic phase- after injection of marker in first 30-120 seconds
- Static phase - every 10 min for 30-45 min
- Secretory phase-after giving sialogogue

BIOPSY

- Not done in routine for discrete salivary gland mass

The indication for incisional biopsy are large lesion in oral

cavity/ Suspicious of malignancy / when there is skin involvement.

PROCEDURE

- With proper cleaning and draping under local anaesthesia small amount of tissue is removed with a needle inserted into the gland sent for pathological examination..

COMPLICATIONS

- Bleeding
- Infection
- Injury to facial and trigeminal nerve
- Allergic to anaesthetic

SIALOENDOSCOPY

Recent advances in optical technology,to directly visualise intra-ductal stones. Tried nowadays for fragmenting and stone retrieval.

STAGING

TNM STAGING.

Primary tumor (T)

TX Primary tumor cannot be assessed

T0 No evidence of primary tumor

Tis Carcinoma in situ

T1 Tumor ≤2cm in greatest dimension without extraparenchymal extension

T2 Tumor >2cm but ≤4cm in greatest dimension without extraparenchymal extension

T3 Tumor >4cm and/or tumor has extraparenchymal extension

T4a Moderately advanced disease

- Tumor invades the skin, mandible, ear canal, and/or facial nerve

T4b Very advanced disease

- Tumor invades skull base and/or pterygoid plates and/or encases carotid artery

Regional lymph nodes (N)

NX Regional nodes cannot be assessed

N0 No regional lymph node metastasis

N1 Metastasis in a single ipsilateral lymph node ≤3cm in greatest dimension

N2

N2a Metastasis in a single ipsilateral lymph node >3cm but ≤6cm in greatest dimension

N2b Metastasis in multiple ipsilateral lymph nodes, none >6cm in greatest dimension

N2c Metastasis in bilateral or contralateral lymph nodes, none >6cm in greatest dimension

N3 Metastasis in a lymph node >6cm in greatest dimension

Distant metastasis (M)

M0 No distant metastasis

M1 Distant metastasis

STAGE GROUPING

STAGE I	T1, 2	NO	NO
STAGE II	T3	NO	NO
STAGE III	T1, 2	N1	MO
STAGE IV	T4	NO	NO
	T3, 4	N1	MO
	ANY T	N2	MO
	ANY T	N3	MO
	ANY T	ANY N	M1

PROGNOSTIC INDICATORS FOR PAROTID CA

I. Stage

II. Histology and Grade

III. Site – parotid/non - parotid

IV. Nodal metastasis

V. Surgical margins

VI. Perineural spread

VII. Facial Nerve paralysis

VIII. Pain

IX. Distant metastasis

X. Gender

TREATMENT

There are three methods of treatment:

- Surgery
- Radiotherapy
- Chemotherapy

SURGERY

Surgery for Parotid Gland:

- Superficial conservative parotidectomy
- Total conservative parotidectomy
- Radical parotidectomy
- Neck dissection

Facial Nerve :

- Methods of identification
- Methods of protection
- Repair
- Rehabilitation

PAROTID GLAND TUMOURS:

- 90% confined to superficial lobe – superficial parotidectomy

- Adenoma in deep lobe - total parotidectomy
- If invades adjacent soft tissue – radical parotidectomy
- Nerve grafting can be performed and RT can start 3-4 wk post op without adverse affects

ENUCLEATION/WIDE EXCISION

- Not recommended
- As it does not completely remove tumour extensions beyond capsule.
- Recurrence rate 30%-50%

SUPERFICIAL PAROTIDECTOMY

I. Adequate exposure

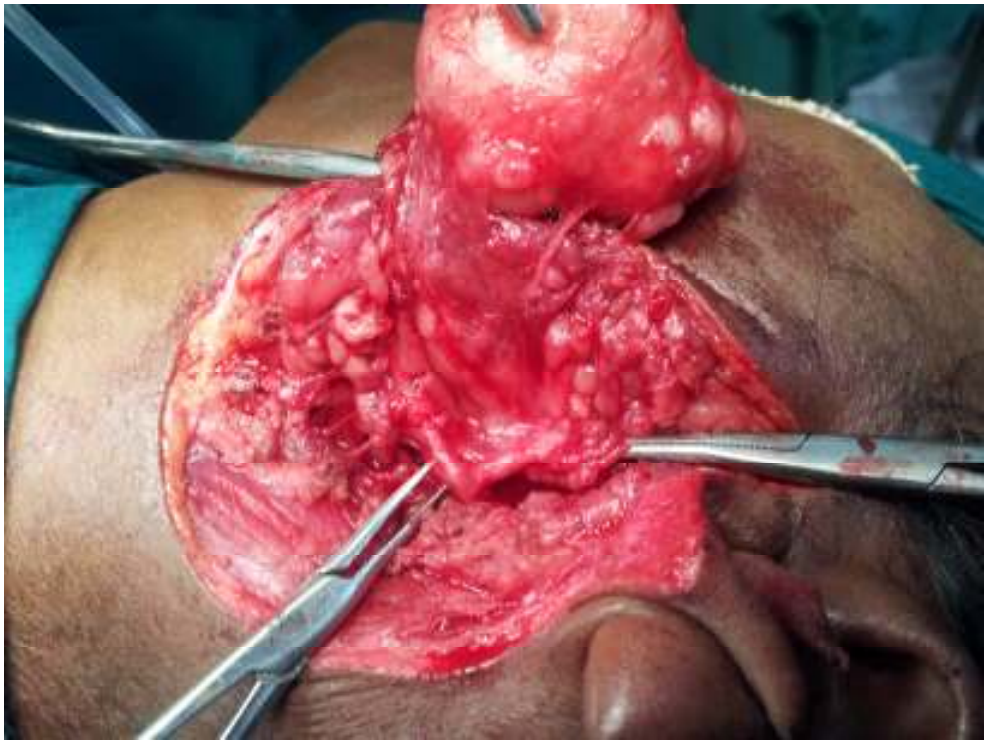
obtained by an incision starting in front of tragus of pinna, vertically descends downwards ,curves round the ear lobule upto the mastoid process and is carried downwards in the neck (Lazy S Incision).

II. Recognizing the facial nerve at surgery:

1. Facial nerve lies 1cm inferomedial to the pointed end of tragal cartilage of the external ear.

FACIAL NERVE

INTRA OP PICTURE



Careful and meticulous dissection of Facial Nerve

during Superficial Parotidectomy Surgery

2. Trace the posterior belly of digastric upto the mastoid process. facial nerve is in between the muscle and tympanic plate.

3. To use nerve stimulator.

III. Developing a plane**:**

Facial nerve and retromandibular vein divides the parotid gland into superficial and deep lobes.Benign tumours do not invade this fascio venous plane of patey.

IV. Tumour along with lobe should be removed in toto to avoid spillage.

TOTAL PAROTIDECTOMY

Nerve preserving total parotidectomy

Nerve sacrificing total parotidectomy(radical)

RADICAL PAROTEDECTOMY

Refers to removal of:

- Both superficial and deep lobes
- Parotid duct
- Fibres of masseter
- Buccinator
- Pterygoids
- Facial nerve and radical block dissection of neck.

COMPLICATIONS – PAROTID SURGERY

- Hematoma formation
- Infection
- Seroma
- Facial nerve weakness
- Frey's syndrome
- Numbness over ear lobe – greater auricular nerve injury
- Salivary fistula
- Sialocele

Frey's syndrome (Gustatory sweating):

- It occurs after surgery to parotid tumours, surgery in the region of TM joint, or due to injury to parotid gland.Due to cross re-innervation between the postganglionic secretomotor parasympathetic fibers to the parotid gland & the postganglionic sympathetic fibers supplying the sweat glands of the skin.
- Diagonosis depend largely on the patient's symptoms but can be confirm by Minor's starch & iodine test.
- Treatment :

  1) Antiperspirant

  2) Glycopyrrolate lotion

3) Tympanic neurectomy

4) Muscle flap or sheep of facia between the skin and the parotid.

5) Division /Avulsion of auriculo temporal nerve

Salivary fistula

- Uncommon & Self limited
- Clear sialorrhea or fluid collections
- Treated by

1) wound care

2) pressure dressing

3) repeated aspiration of fluid collections

4) oral anticholinergics

SURGERY - SM Gland:

- Submandibular gland excision - Submandibular Sialadenectomy
- Submandibular triangle dissection

INDICATIONS

- Sialadenitis
- Salivary tumors

Position:

- Pt kept supine with neck extended and face tilted to the opposite side

Steps :

1. Incision and exposure of gland
2. Gland mobilization
3. Dissection of deep lobe and identification of lingual nerve
4. Wound closure

Procedure

- After cleaning and draping, skin incision of 5cm length is made 4cm below the lower border of mandible – to avoid injury to marginal mandibular nerve, platysma is then incised, anterior facial vein ligated. On retracting the superficial lobe superiorly, tendons of anterior and posterior bellies of digastric muscle identified, following which facial artery identified,ligated and divided. On meticulous dissection close to posterior border of mylohyoid, and by retracting gland inferiorly, lingual nerve identified and protected and deep lobe dissection completed, submandibular

duct then identified and ligated. After attaining perfect hemostasis, DT kept, wound then closed in layers.

NERVES AT RISK

- Marginal mandibular branch of facial nerve
- Lingual nerve
- Hypoglossal nerve

COMPLICATIONS FOLLOWING SUBMANDIBULAR SURGERY

- Nerve injury –

  lingual nerve, hypoglossal nerve,marginal mandibular nerve.
- Hematoma
- Infections

SURGERY

Minor Salivary Glands

Benign:

Upper lip : Excision followed by → closure of defect

Palate : 1 cm → excision → healing by sec intention

1 cm→ incisional biopsy → definetive Rx

Malignant:

Palate:

- Wide excision (low – level or total maxillectomy)
- Defect treated by
    - replacement with Prosthesis
    - Microvascular flaps (radial, fibular, RA, LD, illiac crest graft)

II: NECK DISSECTION

- In high-grade or large tumor. The incidence of occult regional disease is relatively high, so the selective (supraomohyoid) neck dissection should be considered
- In low-grade malignancy the elective neck dissection not recommended.

RADIOTHERAPY

- Adjuvant radiotherapy is superior to surgery alone , effective to improve locoregional control & highly recommended in patient with poor prognosis.

- In inoperable cases, the neutron irradiation alone is the therapy of choice & better than conventional proton or electron therapy & even to debulking procedure.

RADIATION

- For Surgically unresectable tumors
  - EBRT with photon /electrons with conventional or altered fractionation
  - Brachytherapy ± EBRT
  - Neutron therapy

POSTOPERATIVE RADIATION

INDICATIONS:

- Close surgical margins (deep lobe parotid tumors, facial nerve sparing)
- Microscopically positive margin
- High grade tumours like adenoid cystic carcinoma.
- Involvement of skin, bone, nerve (gross or extensive perineural invasion), tumor extension beyond capsule with periglandular and soft tissue invasion.
- Lymphatic spread

- Large tumors requiring radical resection
- Tumor spillage
- Recurrence.

RADIATION

Dosage – Post op treatment

- To be given within 6 weeks of surgery
- High Risk 2.0 Gy/fraction to 60Gy and 1.8Gy/ fraction to 63Gy
- Small volume known microscopic disease 66 Gy
- Elective at risk 50 Gy (2.0Gy/fx) 54 Gy(1.8Gy/fx)
- Gross residual 70Gy

COMPLICATIONS:

Salivary function

- Complete loss of salivary function if >35 Gy
- Dose limit maximum - 26 Gy

Trismus

- Temporo mandibular joint and masseter muscle < 50Gy
- Physiotherapy during and after treatment

NEUTRON THERAPY

- High LET radiation
- Double strand DNA damage
- Less cell cycle specific
- High RBE
- Less dependency on cellular O2

Chemotherapy:

Its role in salivary gland tumours is uncertain.

Only used as palliative therapy in salivary gland malignancies.

Various drugs namely,

- Cisplatin
- Adriamycin
- 5-fluro uracil,
- Cyclophosphamide,
- Bleomycin are available.

FACIAL NERVE INJURY

- Temporary paralysis(neuropraxia) occurs in 10-30%
- Permanent paralysis in 1%
- Facial nerve injury occurs in 10% of superficial parotidectomies.
- Common injury occurs to mandibular branches.

NEUROPRAXIA

- Transient
- Because of traction
- Recovers in 6-8 weeks
- No active treatment is required

TRANSECTION OF FACIAL NERVE

1) WITHOUT NERVE TISSUE LOSS

If identified during surgery,

Immediate suturing with 10-0 nylon silk under microscope.

2) WITH NERVE TISSUE LOSS OR NERVE DELIBERATELY RESECTED WITH TUMOUR

- Cable graft-greater auricular nerve
- Bioartificial nerve grafts

SURGERIES FOR ESTABLISHED FACIAL NERVE INJURY

- Reinnervation by "Hypoglossal nerve transfer"for facial muscles
- Cross facial nerve grafting through "Sural nerve autograft"
- Temporalis muscle transfer
- Regional muscle transfer
- Eyelids weight implants
- Unilateral brow lift- to lift the eyelid

MEN, MATERIALS AND METHODS

Inclusion criteria

All patients who attended our surgical out patient department with swellings in the salivary gland region were included in our study during the study period of Aug 2010 - Nov 2012 to analyse their nature, pathognomic features and to evaluate the line of management.

Exclusion criteria

Patients age less than 13 years were excluded from the study.

Ethical consideration

All patients were explained about the study, Informed consent regarding recording their information and examination was obtained from one and all

Basic platform:

Detailed history regarding chief complaints and associated symptoms.

Physical examination

Included general & local examination.

General physical examination

Examination was done by inspection in day light,followed by gentle palpation, percussion and auscultation. Vital signs (blood

pressure, pulse, respiratory rate and body temperature) were examined and recorded.

Local examination

After making patient relaxed examination of head and neck done.

Gland involved and size of gland

Swelling (location, number and size),

The extent of the lesion (localized or diffuse)

Neurologic examination.

Palpation for regional/generalised lymphadenopathy

done to note the number, size, site, fixity and mobility of the nodes and noted in the clinical proforma.

All routine baseline and confirmatory investigations were done namely

Pathological – FNAC,incision biopsy,excision biopsy

Radiological – USG,CT SCAN,MRI SCAN.,were done as per necessity.

Treatment was given according to diagnosis by medical management, surgery ,surgery and adjuvant RT.

Complications developed following medical/surgical management were recorded.

Patients kept on keen follow up for a period of three months.

OBSERVATIONS AND RESULTS

DISTRIBUTION OF GLAND SWELLINGS BY DISEASE FREQUENCY

1. From our study, out of 60 patients, Benign tumours are the most common pathology among various salivary gland swellings comprising 32 patients.
2. Among them pleomorphic adenoma is the most common Benign neoplasm exceptionally affecting around 25 patients among 32 benign tumours (A = 25) (41.6%).

TABLE – 1

Diagnosis	Parotid	Submandibular	Minor Sublingual
Benign Tumour :			
Pleomorphic adenoma	25	-	-
Warthins tumour	2	-	-
Basal cell adenoma	1	-	-
Lipoma	1	-	-
Hemangioma	1	-	-
Sebaceous adenoma	2	-	-
Malignant Tumour :			
Mucoepidermoid carcinoma	4	-	-

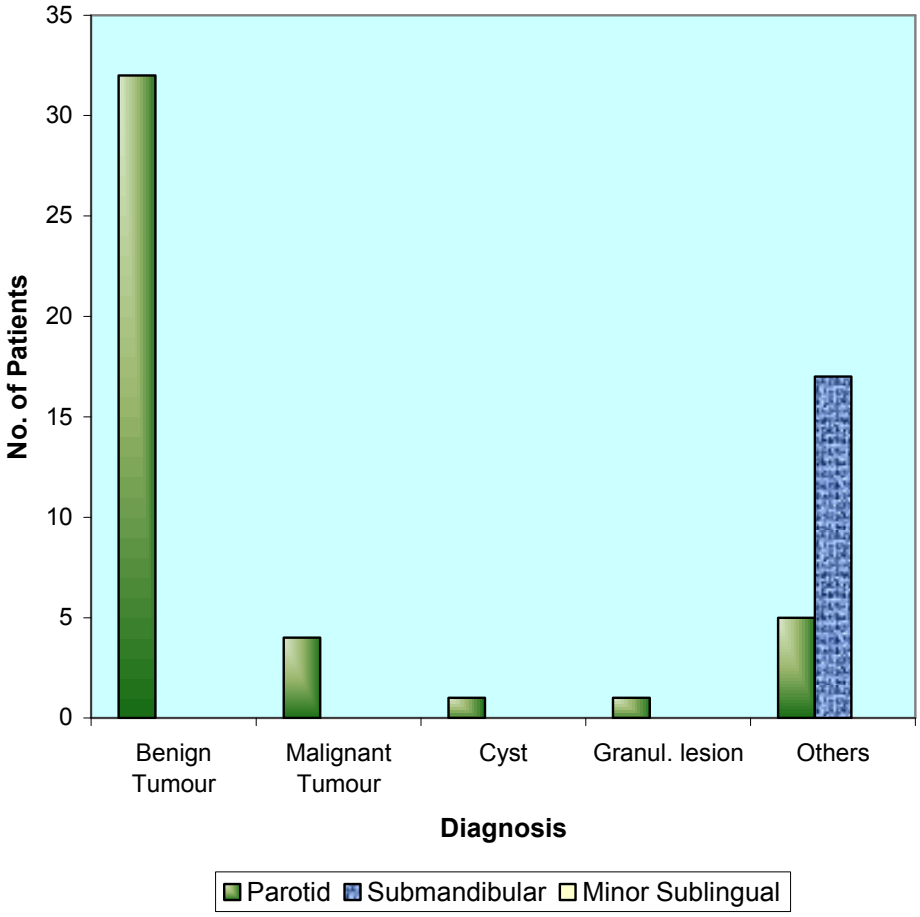
Cyst			
Lymphoepithelial cyst.	1	-	-
Granul. lesion	1	-	-
Others			
Lymphadenitis	0	2	-
Sial adenitis	-	15	-
Parotitis	1	-	-
Mumps	1	-	-
Parotid abscess	3	-	-

3. Sialadenitis, due to specific / non-specific cause is the 2nd major gland swelling, next to pleomorphic adenoma, in our study group affecting 15 patients. Exclusively, all patients presented with submandibular gland involvement (n=15) (25%).
4. Four case had malignant neoplasm – mucoepidemoid carcinoma involving the parotid gland (n=4) (6.67%).
5. Though, according to literature, warthin's tumour is considered the second most common benign tumour, there were 2 only cases in our study group.
6. Basal cell adenoma,though a rare neoplasm,has been encountered in 2 cases in our study.

FIGURE - 1

DISTRIBUTION OF GLAND SWELLINGS BY

DISEASE FREQUENCY



Age & Sex Ratio:

Among the 60 patients, who underwent our study, there were 32 males and 28 females, showing slight male preponderance (sex ratio = 1.1:1).

TABLE –2

DISTRIBUTION OF PATIENTS BY AGE

Age Group	No. of Patients	Percentage
10-20	2	3.3%
21-30	14	23.3%
31-40	12	20%
41-50	19	31.7%
51-60	7	11.7%
61-70	3	5%
71-80	3	5%
Total	**60**	**100%**

Results from the Table 1 showed above implies, patients with age group 41-50 years (5^{th} decade) is the most affected age group (31.7%) with 19 patients followed next by 12 patients in 31-40 years age group (20%).

FIGURE – 2

DISTRIBUTION OF PATIENTS BY AGE

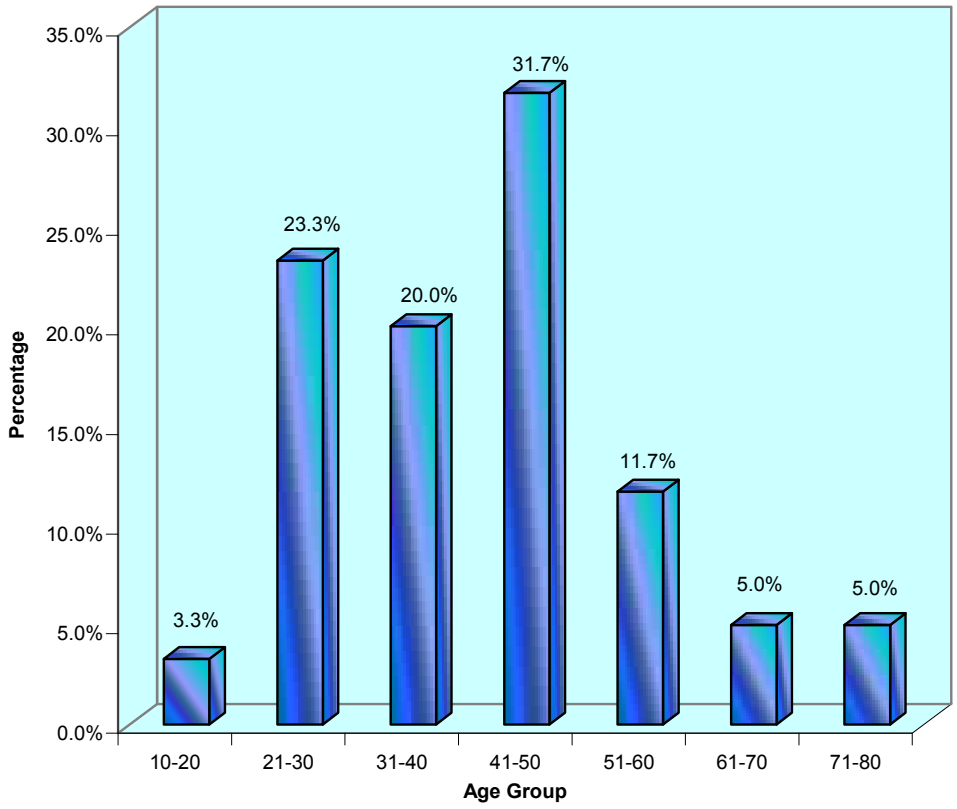


TABLE – 3

DISTRIBUTION OF SALIVARY GLAND SWELLINGS BY SEX

Gland	Benign		Malignant		Total		Grand Total
	M	F	M	F	M	F	
PG	16	23	4	-	20	23	43
SMG	14	3	-	-	14	3	17
MSG	-	-	-	-	-	-	-
Total	30	26	4	0	34	26	60

From this table, we come to an observation that both malignant tumour and benign condition has male preponderance.

.

FIGURE – 3

DISTRIBUTION OF SALIVARY GLAND SWELLINGS BY SEX

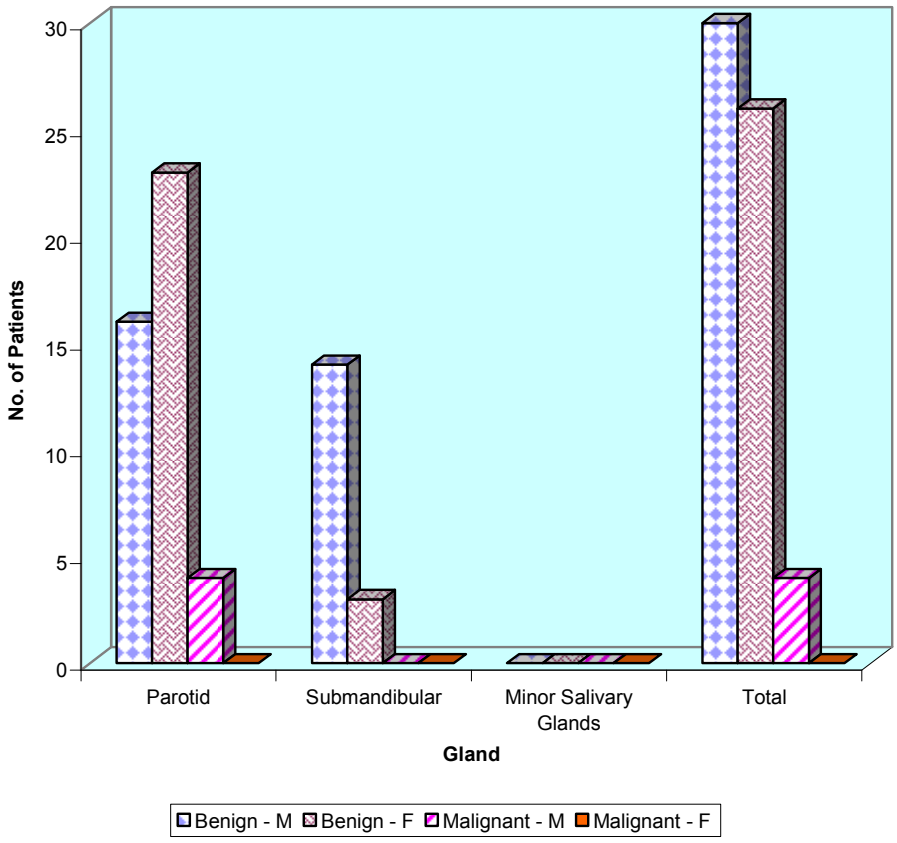


TABLE – 4

DISTRIBUTION OF SALIVARY GLAND SWELLINGS BY ANATOMICAL SITE

Gland	Male	Female	Total	Percentage
Parotid	18	25	43	71.7%
Submandibular	14	3	17	28.3%
Minor Salivary Glands	-	-	-	-

From the above said Table 3 salivary gland swellings were noted only in the major salivary glands and no involvement of minor salivary glands – documented.

Out of which parotid gland involvement has been noted in majority of cases 71.7% and submanibular gland occupies the rest of the pathology (28.3%).

FIGURE – 4

DISTRIBUTION OF SALIVARY GLAND SWELLINGS BY ANATOMICAL SITE

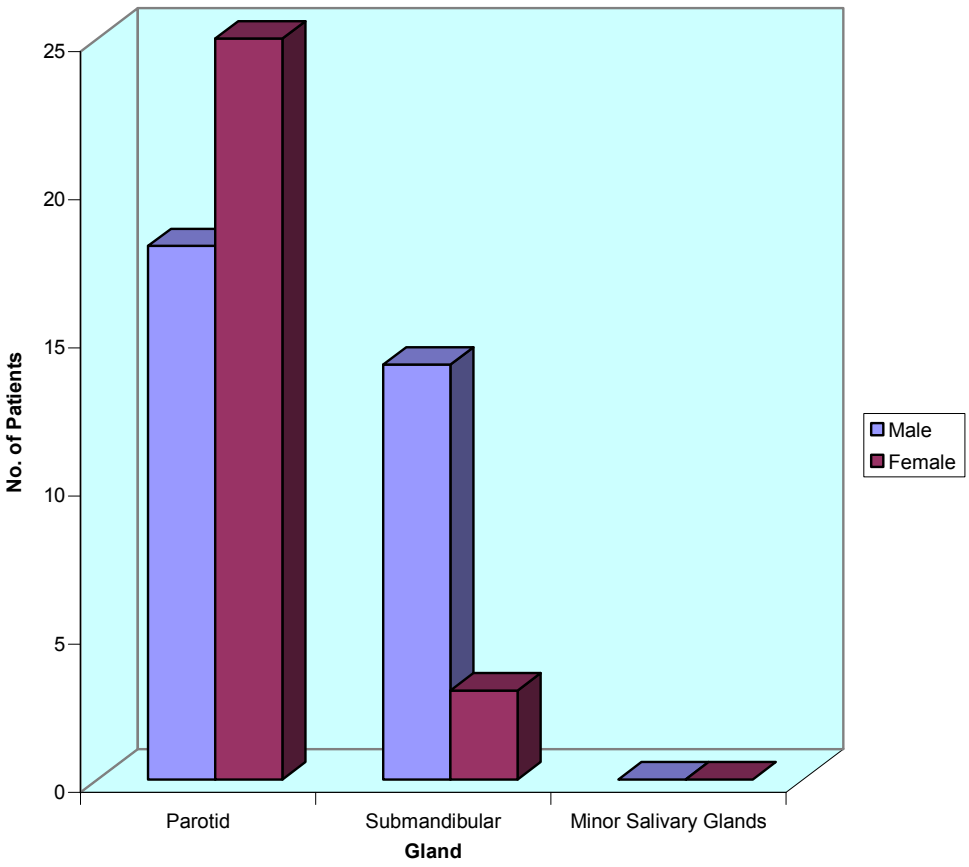


TABLE – 5

BENIGN VS. MALIGNANT NEOPLASMS

Gland	Benign	Malignant	Total
Parotid	32	4	36
Submandibular	-	-	-

From this table,

- Parotid is the salivary gland exceptionally involving both benign and malignant neoplasms (n=32).
- Benign tumours are much more common than malignant tumours (n=4), involving parotid region.

FIGURE – 5

DISTRIBUTION OF GLAND NEOPLASMS BY DISEASE FREQUENCY

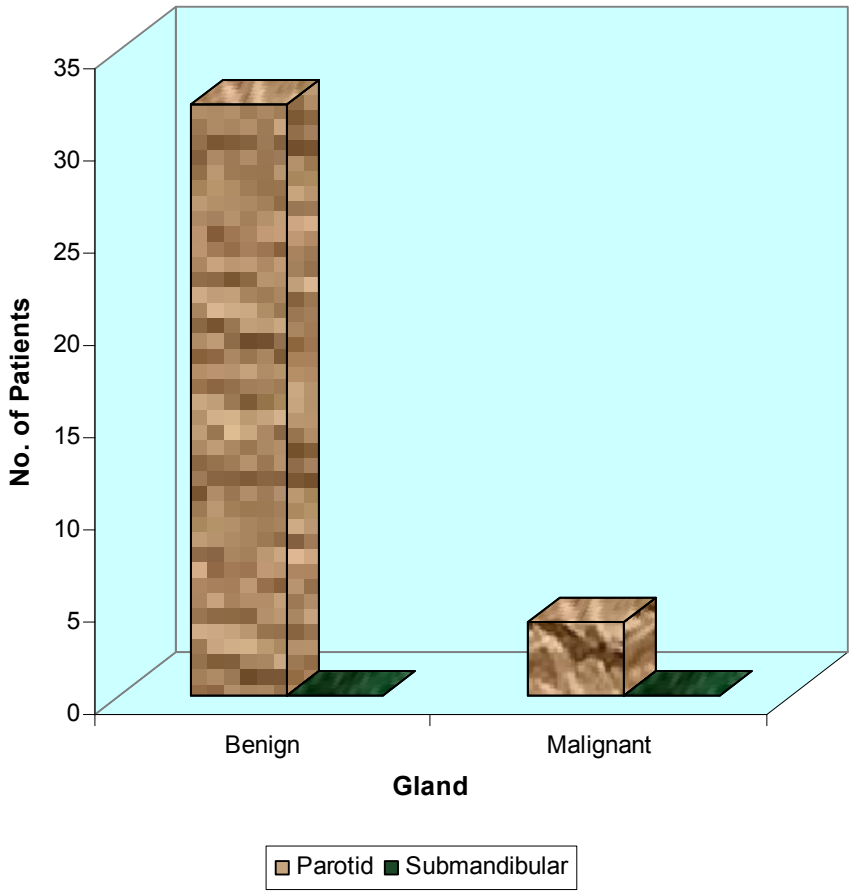


TABLE - 6

PATTERN OF CLINICAL PRESENTATION – DISTRIBUTION

Clinical Presentation	No. of Patients
Swelling Alone	28
Swelling with Pain	22
Swelling with Pain and7th nerve palsy	1
Swelling with Node	1

This Table No. 6 clearly implies out of 60 patients in our study group

Asymptomaticswelling is the commonest presentation (63.33%).

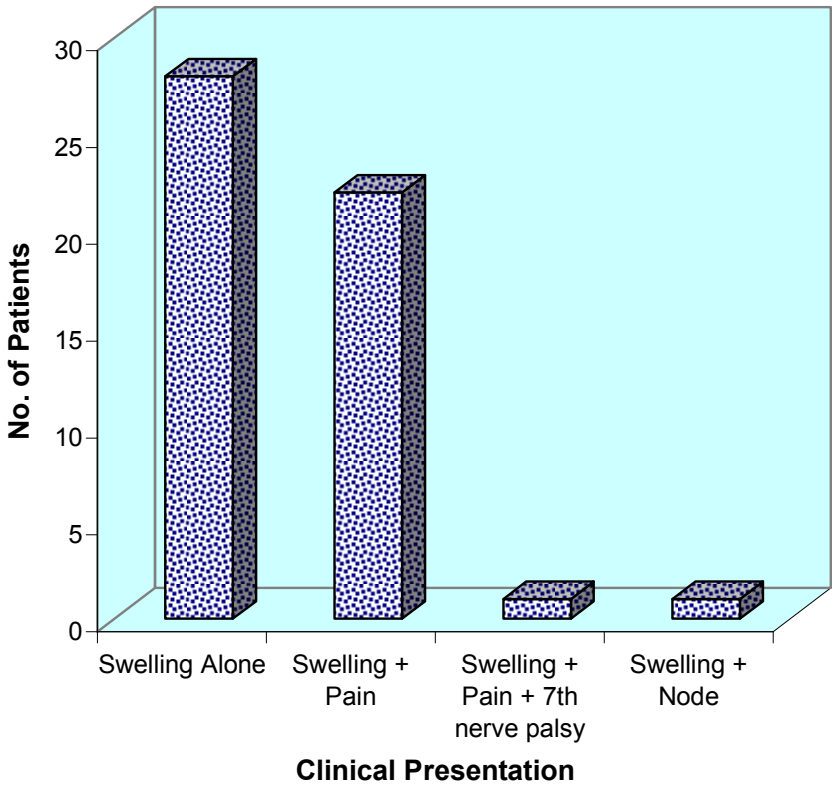
Pain – Associated & swelling is noticed in 22 cases (out of 60) accounting for 33.34% of cases.

Pre-op 7th nerve palsy is seen in 1 case – 1.67%

Node involvement with swelling is noticed in 1 patient – 1.67%.

FIGURE - 6

CLINICAL PRESENTATION – DISTRIBUTION



RISK FACTORS

Out of 60 cases, 14 cases were exposed to risk factors namely smoking, spirit consumption etc.

TABLE - 7

	Males	**Females**	**Total**
Smokers	7	1	8
Smokers + Spirit consumption	4	-	4
Total	11	1	12

Out of 12 cases, 11 were males and one female – exposed to risk factors.

Out of 11 males, 7 were smokers, 4 were smokers + spirit consumption, and 1 female was smoker(tobacco variant).

Among male smokers :

Every patient used to smoke one packet per day.

Among them those who had beedi alone- 7 patients

Those who had beedi/ cigareete both-2 patients

Those who had cigar alone – 1 patient.

Among alcohol consumers :

All 4 patients used to have minimum 180 ml daily.among them 3 had only beer,1 used to have any available variant.

FIGURE - 7

RISK FACTORS

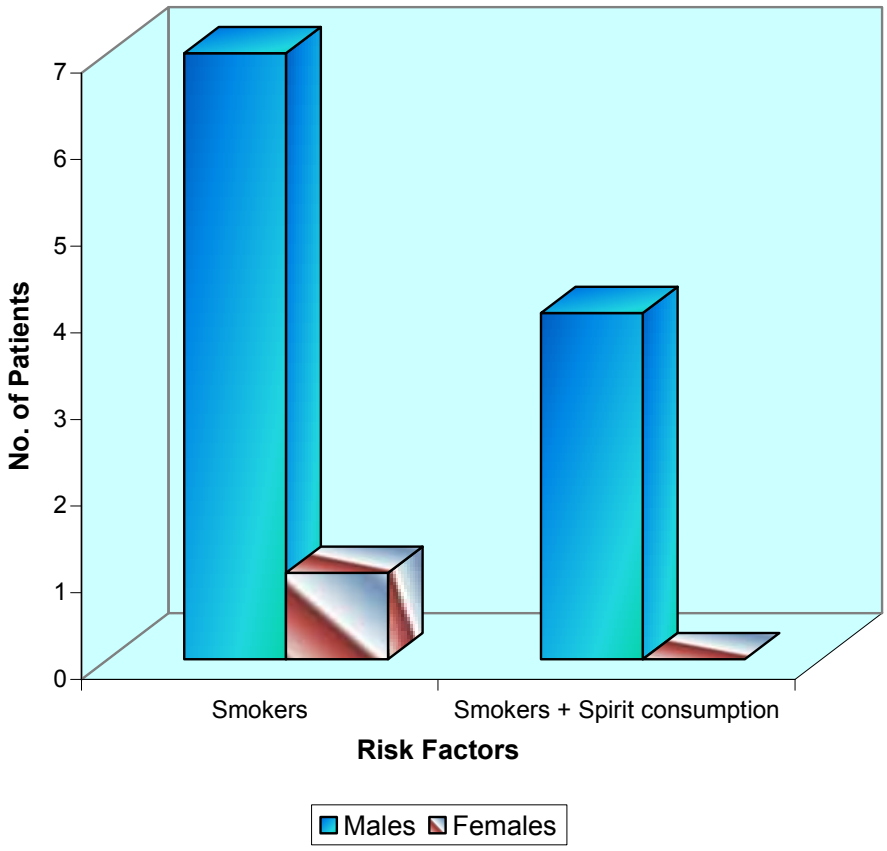


TABLE – 8

TREATMENT

Surgery	No. of Patients
Superficial Conserv Parotidectomy	31
Submandib. gland excision	15
Total Parotidectomy	4
Incision & Drainage	3
Conservative Management antibiotics alone	4
Hemangioma Excision	1
Lipoma Excision	1
Sebaceous adenoma excision	1

POST OPERATIVE COMPLICATIONS

1) Facial nerve palsy:

5 cases inevitably/unfortunately developed facial nerve palsy in the post op period after surgery.4 were neuropraxias, which improved within weeks .One patient is on physiotherapy

2) Flap necrosis

Two cases developed flap necrosis following superficial parotidectomy.

3) Seroma

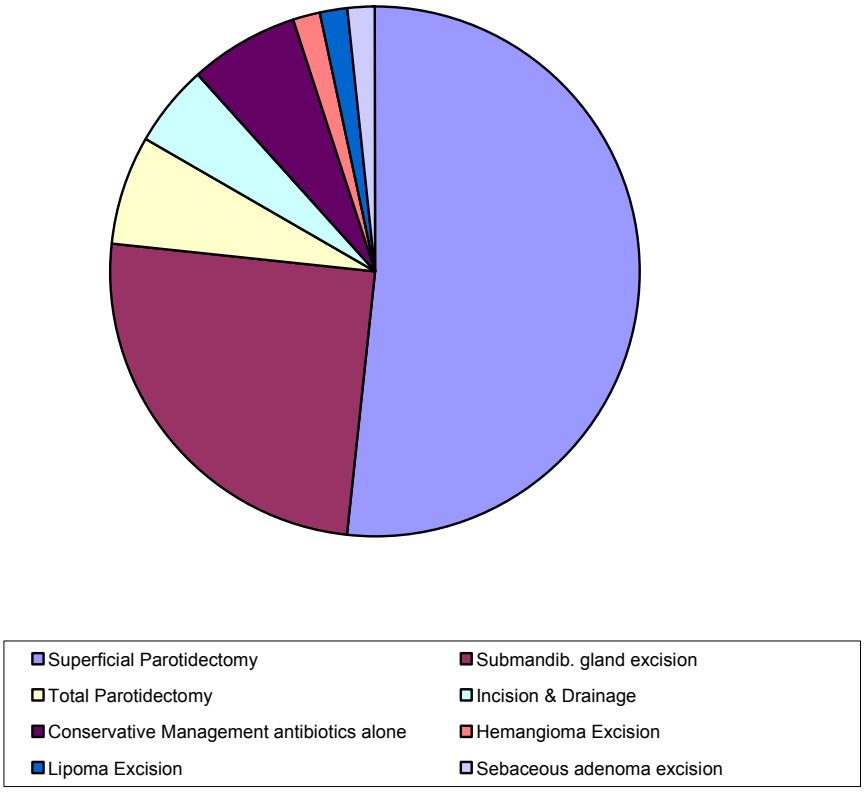
Noted in 4 cases.among them 3 cases developed after superficial parotidectomy.

4) Infection

Seen in 6 cases. Out of them 5 developed after superficial parotidectomy and 1 developed after submandibular gland excision.

FIGURE – 8

TREATMENT



CONCLUSION

From our study, we have arrived at the following conclusions.

- Salivary gland swellings are common ailments in our geographic area but incidence of malignancy is interestingly very low.
- Salivary gland pathology mostly involves patients on fourth decade 41-50 years.
- Distribution by sex shows male preponderance.
- Parotid gland is the more involved gland by any salivary gland pathology.
- Pleomorphic adenoma is the most common benign neoplasm (41.6%).
- The most common presentation is the painless slow growing swelling (63.33%).
- Conservative superficial parotidectomy is the procedure most commonly done.
- Incidence of post-op 7^{th} N.palsy after superficial parotidectomy is very meagre (8.3%).

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.

PROFORMA

Name	:		
Age	:		
Sex	:		
IP No	:	D.O.A :	
Occupation	:	D.O.S :	
Address	:	D.O.D :	

HISTORY

Complaints of :

1.	Swelling	:	Site of onset/ Duration
			Sudden rise/decrease in size of swelling
			History of discharge/ulcer if any
2.	Pain	:	Duration
			Over swelling
			Referred from anywhere
			Aggravated by chewing food
			Type
			Severity
			Radiating type?
3.	History of	:	Salivary flow
			Nerve involvement

i) Facial Nerve :

Deviation of angle of mouth

Stasis of food particles in oral cavity

Drooling of Saliva

Eye symptoms

ii) Hypoglossal Nerve

Mastication difficulty

Difficulty in speech

H/o pus discharge through duct

H/o any bleeding from ulcer / duct

iii) Lingual Nerve

Sensation of taste

4. Past & Personal History : H/o DM / HT / PT

Smoking / Alcohol / Tobacco Chewing

4. Family History :

6. Menstrual and Obstetric history : (Female cases)

GENERAL EXAMINATION

Pallor :

Hydration status :

Lymphadenopathy :

Vitals :

LOCAL EXAMINATION

INSPECTION (Swelling) : Site, Size,Shape,Surface,Skin over the swelling

Surroundings

PALPATION : Warmth

Tenderness

Site, Size, Shape and Surface

Skin over the swelling

Margins

Consistency

Plane of swelling

Mobility

ORAL EXAMINATION : Bidigital palpation for

submandibular and sublingual glands.

Salivary gland ducts - Any discharge

during manipulation.

Deep lobe - Bulging of lateral wall noted ,

NERVES :

<u>Facial nerve</u>

Loss of forehead wrinkling/Weakness of closure of eyelids/ Obliteration of nasolabial fold/ Deviation of angle of mouth

Lingual nerve

Taste Sensation over tongue

Hypoglossal nerve

Deviation of tongue

Cervical Lymphadenopathy

EXAMINATION OF OTHER SYSTEMS

Cardiovascular System

Respiratory System

Abdomen

Central Nervous System

PROVISIONAL DIAGNOSIS :

INVESTIGATION WORK UP

1. BASELINE INVESTIGATIONS

2. CXR / ECG

3. FNAC

4.FURTHER INVESTIGATIONS

X-Rays, CT Scan, core biopsy

TREATMENT

SURGERY **:** Superficial partotidectomy

Conservative total parotidectomy

Radical parotidectomy

Submandibular gland excision.

INTRA OP FINDINGS : Type of incision(inverted y / lazy s)

Tissue Infiltration

Involvement of Deep lobe

VII nerve

GROSS/ C. S. FINDINGS

HPE & BIOPSY RESULT

ADJUVANT MODALITIES :

RADIOTHERAPY/ CHEMOTHERAPY

POST OP COMPLICATIONS :

Wound infection

Seroma

Flap necrosis / fistula

Nerve palsy / paresis

MASTER CHART

S.No	NAME	Age	Sex	IP No	Site	Side	Symptoms			Risk	Investigations				Diagnosis	Management		Biopsy	Post op Complication-			
							Pain	Nerve Palsy	LA	Factors	USG	CT	MRI	FNAC		Conser	Surg.		Wound Inf.	Seroma	Fistula / Flap Necrosis	Nerve Palsy
1	Bakkiyam	47	F	14317	P	R	+	-	-	-	+		-	+	WARTHIN	-	SP	WARTHIN	-	+	-	-
2	Manikandan	32	M	13306	P	L	-	-	-	+	+	+	-	+	PLA	-	SP	PLA	-	-	-	+
3	Vijaya	50	F	54075	P	R	+	-	-	-	-	-	-	+	BCA	-	SP	BCA	-	-	-	-
4	Logambal	40	F	57132	P	R	-	-	-	-	-	+	-	+	PLA	-	SP	PLA	+	-	-	-
5	Vijaya	29	F	53121	P	L	+	-	-	-	-	-	-	+	PLA	-	SP	PLA	-	-	-	-
6	Maheswari	27	F	53312	P	L	-	-	-	-	-	+	-	+	PLA	-	SP	PLA	-	-	-	-
7	Loganayaki	45	F	53337	P	R	-	-	-	+	+	-	-	+	PLA	-	SP	PLA	-	-	-	-
8	Vellappan	57	M	23160	P	R	-	-	-	+	+	-	-	+	PLA	-	SP	PLA	-	-	-	-

9	Settu	27	M	30120	SM	R	-	-	-	+	-	-	-	+	SA	-	SGE	SA	+	-	-	-
10	Ragupathy	27	M	44798	SM	L	-	-	-	-	-	-	-	+	SA	-	SGE	SA	-		-	-
11	Varadharajan	32	M	41479	SM	L	+	-	-	-	-	-	-	+	SA	-	SGE	SA	-	-	-	-
12	Shanmugam	37	M	27297	SM	R	+	-	-	-	+	+	-	+	MEC	-	TP	MEC	-	+	-	-
13	Mathiarasu	20	M	27259	P	L	-	-	-	-	_	-	-	+	PLA		SP	PLA	-	+	-	+
14	Periyammal	30	F	34588	SM	L	+	-	-	+	-	-	-	+	LA	+	EX	LYMPH	-	+	-	-
15	Perumal	34	M	40008	P	R	-	-	-	_	-	-	-	+	PLA	-	SP	PLA	+	-	-	-
16	Sakthivel	35	M	37309	SM	L	+	-	-	+	+	-	-	+	SA	-	SGE	SA	-	-	-	-
17	Dhanalakshmi	71	F	42712	P	R	+	-	-	-	+	+	-	+	MEC	-	TP	MEC	-	-	-	-
18	Shanthi	35	F	41940	P	L	-	-	-	-	-	-	-	-	MUMPS PAROTITIS	+	-	-	-	-	-	-
19	Tamilazhagam	40	M	41492	SM	R	-	-	-	-	-	+	-	-	SA	-	SGE	SA	+	-	-	-
20	Kaliyammal	32	F	98471	P	L	-	-		-	+	+	-	+	CYST	-	SP	PLA	-	-	-	-
21	Kousalya	30	F	21258	SM	R	+	-	-	-	+	-	-	+	SA	-	SGE	SA	-	-	-	-
22	Rajendran	45	M	18749	SM	L	-	-	-	-	-	-	-	+	SA		SGE	SA	-	-	-	-
23	Arumugam	60	M	19254	P	R	-	-	-	-	-	-	-	+	PLA	-	SP	PLA	-	-	-	+

24	Sundaramoorthi	27	M	38076	P	R	-	-	-	-	-	-	-	-	PLA	-	SP	PLA	-	-	-	-
25	Durai	50	M	39861	P	L	-	-	-	-	-	+	-	-	PLA	-	SP	PLA	-	+	-	-
26	Thamaraikannan	24	M	37454	SM	R	+	-	-	+	-	-	-	+	LA	+	EX	LYMPH	-	-	-	-
27	Jayakumar	45	M	40554	P	L	-	-	-	-	-	-	-	-	PLA	-	SP	PLA	-	-	-	-
28	Thiyagarajan	46	M	39346	SM	R	-	-	-	-	-	-	-	+	SA	-	SGE	SA	-	-	-	-
29	Sundaramoorthi	27	M	36861	P	L	-	-	-	-	-	-	-	-	PLA	-	SP	PLA	-	-	-	-
30	Jayakumar	45	M	40554	P	R	-	-	-	+	+	+	-	-	PLA	-	SP	PLA	+	-	-	-
31	Chinnakannan	70	M	46119	P	R	+	-	-	-	+	-	-	+	PLA	-	SP	PLA	-	-	-	-
32	Elumalai	46	M	50840	SM	R	-	-	-	-	-	-	-	+	SA	-	SGE	SA	-	-	-	-
33	Arumugam	60	M	19254	P	R	-	-	-	-	-	-	-	+	PLA	-	SP	PLA	-	-	-	+
34	Raji	60	M	33434	SM	L	+	-	-	-	+	-	-	+	SA	-	SGE	SA	-	-	-	-
35	Eswaran	20	M	49051	SM	L	+	-	-	-	+	-	-	+	SA	-	SGE	SA	-	-	-	-
36	Mumtaj	45	F	27561	P	L	-	-	-	-	+	-	-	+	PLA	-	SP	PLA	-	-	-	-
37	Palani	21	M	25714	SM	L	+	-	-	+	+	-	-	+	SA	-	SGE	SA	-	-	-	-
38	Kuppusamy	41	M	50971	P	R	+	-	-	+		-	-	_	PAROTITIS	+	-	-	-	-	-	-

39	Samsath	50	F	44798	P	L	-	-	-	-		-	-	-	PLA	-	SP	PLA	-	-	-	-
40	Sadasivam	50	M	50851	SM	R	-	-	0	-	+	-	-	+	SA	-	SGE	SA	-	-	-	-
41	Nallammal	80	F	43037	P	L	+	-	-	-	+	-	-	+	ABSCESS	+	I/D	SUPP	-	+	-	-
42	Selvi	25	F	46326	SM	R	+	-	-	-	+	-	-	+	SA	-	SGE	SA	-	_	-	-
43	Chinnakannu	50	F	40020	P	R	-	-	-	-		-	-	+	PLA	-	SP	PLA	-	-	-	-
44	Chinnakannan	70	M	46119	P	L	-	-	-	-		-	-	+	PLA	-	SP	PLA	-	-	-	-
45	Sundaram	45	M	47112	P	R	-	-	-	+	+	-	-	+	PLA	-	SP	PLA	-	_	-	-
46	Sekar	45	M	48114	P	R	+	+	+	+	+	+	+	+	MEC	-	TP	MEC	-	_	-	+
47	Lourdhu	55	M	48117	P	B/L	+	-	-	+	+	+	-	+	WARTHIN	-	SP	WARTHIN	-	_	-	-
48	Muthammal	40	F	42812	P[	R	-	-	-	-	+	+	-	+	SEB ADE	-	EX	SEB ADE	-	-	-	-
49	Pappathi	55	F	37090	P	R	-	-	-	-	+	-	-	+	PLA	-	SP	PLA	-	-	+	+
50	Thamarai selvi	28	F	38345	P	L	-	-	-	-	+	-	-	+	PLA	-	SP	PLA	-	-	-	-
51	Nallammal	80	F	43087	P	L	-	-	-	-	+	-	-	+	LIPOMA	-	EX	LIPOMA	-	-	-	-
52	Selvi	25	F	46321	P	L	-	-	-	-	+	-	-	+	PLA	-	SP	PLA	-	-	-	-
53	Rani	23	F	54295	P	L	+	-	-	-	+	-	-	+	ABSCESS	+	I/D	SUPP	-	-	-	-

54	Dhanalakshmi	61	F	60254	P	L	-	-	-	-	+	-	-	+	HEMANG.	-	EX	HEMANG	-	-	-	-
55	Palaniyammal	61	F	74366	P	L	-	-	-	-		-	-	+	MEC	-	TP	MEC	-	-	-	-
56	Chinnakannu	50	M	40020	P	R	-	-	-	-	+	-	-	+	GRANUL.	-	SP	SARCOID	-	-	-	-
57	Malliga	47	F	50017	P	L	+	-	-	-	_	-	-	+	ABSCESS	+	I/D	SUPP.	-	-	-	-
58	Selvi	36	F	56217	P	R	-	-	-	-	+	-	-	+	BCA	-	SP	BCA	+	-	-	-
59	Maheswari	31	F	73866	P	R	-	-	-	-	+	-	-	+	PLA	-	SP	PLA	-	-	+	-
60	Rajamanickam	48	M	73629	SM	L	+	-	-	+	+	-	-	+	SA	-	SGE	SA	-	-	-	-

M - Male
F - Female
P - Parotid
SM - Submandibular
L - Left
PLA - Pleomorphic Adenoma
SA - Sialadenitis
SGE - Submandibular Gland Excision
MEC - Muco Epidemoid Carcinoma

SEB ADE – Sebaceous Adenoma
I/D – Incision & Drainage
SP – Superficial Parotidectomy
BCA – Basal cell Adenoma
SUPP. – Suppurative Lesion
TP – Total Parotidectomy
Ex – Excision
R – Right
Hemang – Hemangioma